break into pieces which do not allow the escape of the seeds; and (3) fruits which neither dehisce nor fall into indehiscent pieces, including Berries, Drupes, and Achenes. As this last group is very heterogeneous, Dr. Dickson prefers to consider Berries, Drupes, and Achenes severally, as forms of equal value with Capsules or Schizocarps, and therefore would divide fruits into five groups, viz., "Capsules," "Schizocarps," "Achenes," "Berries," and "Drupes," as will be seen in the following table :—

I. CAPSULE — Dry, dehiscing, to allow the seeds to escape.	Simple. (Probably the two forms included under this head should be embraced by a single term.)	1. *Follicle.*—Dehiscing by one suture, usually the ventral: *e.g.*, Aquilegia, Caltha, Magnolia.
		2. *Legume.*—Dehiscing by both sutures: *e.g.*, Cytisus, Vicia, &c.
	Compound.	3. (Name wanted) Seeds escaping by longitudinal rupture of the wall of the capsule (dehiscence by valves, teeth, or pores): *e.g.*, Brassica, Viola, Rhododendron, Iris, Lychnis, Papaver, Campanula, &c.
		4. *Pyxidium.*—Seeds escaping by transverse rupture of the wall of the capsule (dehiscence circumcissile): *e.g.*, from superior ovary, Anagallis, Plantago, Hyosciamus, &c.; from inferior, Bertholletia, &c.
		5. *Regma.*—Seeds escaping by rupture along the inner angles of the lobes into which the fruit separates: *e.g.*, Geranium, Euphorbia, &c.
II. SCHIZOCARP.—Dry, breaking up into indehiscent pieces.	Breaking longitudinally into indehiscent cocci.	6. *Carcerulus.*—Lobes not hanging from forked "Carpophore:" *e.g.*, Tropæolum, Borago, &c.
		7. *Cremocarp.*—Lobes separating from below, and, for a time, hanging from extremities of forked "carpophore:" *e.g.*, (from superior ovary) Acer, and (from inferior ovary) *Umbelliferæ.*
	Breaking transversely into one-seeded joints.	8. *Lomentum.*—*e.g.*, Ornithopus, &c.
	Breaking first longitudinally, then transversely	9. (Name wanted) *e.g.*, Platystemon.
III. ACHENE.—Dry, indehiscent, not breaking up. (Probably the names applied to the different forms should be abolished and the term Achene applied to all.)	Superior.	10. *Acheve* (in restricted sense.—Pericarp not adherent to seed: *e.g.*, Ranunculus, Rumex, Ulmus, Fraxinus, &c.
		11. *Caryopsis.*—Pericarp adhering to seed: *e.g.*, Gramineæ, &c.
	Inferior.	12. *Cypsela.*—Pericarp not much indurated: *e.g.*, *Compositæ*, *Valerianaceæ*, &c.
		13. *Glans.*—Pericarp hard: *e.g.*, Quercus, Castanea, Fagus, Corylus, &c.
IV. BERRY.—Seeds imbedded in pulp. As a rule indehiscent.	Outer portion of pericarp delicate (thin-skinned).	14. *Uva*—Superior: *e.g.*, Vitis, Solanum, &c.
		15. *Bacca* (in restricted sense).—Inferior: *e.g.*, Ribes, Vaccinium, &c.
	Outer portion of pericarp firm, leathery, or hard (thick-skinned).	16. *Amphisarca.*—Superior: *e.g.*, Adansonia, Passiflora, &c. (Citrus should be included here.)
		17. *Pepo*—Inferior: *e.g.*, Cucurbita, Cucumis, &c. (Punica should be included here.)
V. DRUPE.—Endocarp distinctly defined & more or less indurated. Outer portion of pericarp of variable consistence—fleshy, leathery, or fibrous. As a rule, indehiscent.	One-stoned. (Probably the two forms included under this head should be embraced by a single term.)	18. *Drupe* (in restricted sense).—Superior: *e.g.*, Prunus, Cocos, &c.
		19. *Tryma*—Inferior: *e.g.*, Juglans, Viburnum, &c.
	Two or more stoned. (Probably the two forms included under this head should be embraced by a single term.)	20. (Name wanted) Superior: *e.g.*, Ilex, Empetrum.
		21. *Pome.*—Inferior: *e.g.*, Pyrus, Cratægus, Sambucus, &c.
	With one plurilocular stone.	22. (Name wanted) *e.g.*, Cornus.

As the modifications undergone by the fruit in ripening stand in direct relation to the dispersion of the parts by which the plant is disseminated, probably the most philosophical method of classifying fruits would be according to the nature of the parts disseminated. To carry out this principle rigorously, however, would lead to practical difficulties, far outweighing any advantage gained. At the same time, it is evident that the foregoing classification satisfies, in a general way, the conditions of such a method; thus, in capsules and berries, the *seeds*, as a rule, are the ultimate parts disseminated; in Drupes, the *stones;* in Schizocarps, the *mericarps* or *joints*; and in Achenes, the *fruits as wholes.* As refractory exceptions, however, may be mentioned, those cases where the seed *minus* its testa is the part ultimately disseminated, for example, in *Oxalis*, where, on dehiscence of the capsule, the elastic testa becomes ruptured, violently expelling the body of the seed with the tegmen; or in the so-called drupaceous seeds (*e.g.* in *Punica*) which are doubtless devoured by birds, and, after digestion of the pulpy testa, the body of the seed with the hard tegmen is evacuated, and dissemination occurs. Or, again, in such a drupe as the apple, where the induration of the endocarp is slight, we have the fruit behaving as a berry, and dissemination taking place by means of the seeds.

Some botanists may perhaps be surprised to note the omission of the terms *siliqua* and *silicula*, so universally employed to designate the fruits of *cruciferæ*. A little reflection, however, is sufficient to make it evident that, if distinctions so trifling in character, as those which separate these fruits from other valvular capsules, were consistently carried out in practice, the terminology would become altogether intolerable. A similar argument may be adduced in favour of the suggestion made in the foregoing table, as to the propriety of devising some common term which will supersede those of *follicle* and *legume.*

NOTES

WE are happy to say that the Eclipse Committee has been perfectly successful in its attempt to send a complete set of instruments to Australia; and a code of instructions is being drawn up in order to ensure similar observations being made at all stations.

IT is now announced that the Swedish Government has abandoned the intention of establishing a colony in Spitzbergen for permanent scientific observation, mainly, it appears, in consequence of jealousies on the part of the Russian Government.

THE autumn meetings of the Iron and Steel Institute were commenced at Dudley on Tuesday morning, under the presidency of Mr. Henry Bessemer. About 250 members of the Institute were present, and during the course of the proceedings, the secretary announced that forty-seven new members had been elected, amongst whom were the Earl of Dudley, and Sir Antonio Brady, of London. The President, in opening the meeting, described the locality in which it was assembled as one of the most interesting districts this country presented to the iron manufacturers—a district, indeed, in which they might say that the great iron industry took its rise; its very cradle and birthplace. Mr. H. Johnson, mining engineer, read a paper "On the Geological Features of the South Staffordshire Coalfield, in Special Reference to the Future Development of its Mineral Resources." The South Staffordshire coalfield, one of the oldest in Great Britain, he said, was remarkably rich in coal, ironstone, and limestone. The secretary then read a paper by Mr. John Giers, Middlesboro', "On the Ayresome Ironworks, Middlesboro', with Remarks upon the Alteration in the Size of Cleveland Furnaces during the last Ten Years." A paper was read by Mr. Thomas Whitwell, Thornaby Ironworks, Stockton, "On further Results from the Use of Hot Blast Fire, brick Stoves." Mr. T. W. Plum, Shifnal, Salop, read a paper "On the Advantages of increased Height of the Blast Furnaces in the Midland District." The last paper was read by Mr. J. Lowthian Bell, Newcastle, "On Mr. Ferries' Self-coking Furnace." A large party then proceeded by train to Tipton, where the ironworks between that town and Wolverhampton were visited, and a pleasant afternoon was spent in investigating the mechanical processes in some of the largest works of South Staffordshire. The meetings conclude on Friday.

In his last weekly return, the Registrar-General refers to the westward advance of Asiatic cholera as investing with more than ordinary interest Dr. Frankland's usual monthly report upon the quality of the metropolitan water supply. The water supplied by the New River and Kent Companies is again reported freest from organic impurity, that of the East London and Chelsea Companies the most impure. With reference to the advantage which would be derived from a general application of Dr. Clark's softening process to the London water supply, the Registrar-General adduces the following valuable facts, which have been communicated by Mr. Robert Rawlinson, C.B., C.E. :—"The average daily water supply to the metropolis was 111,292,104 gallons in June, and 112,107,697 gallons in July. Now in each million gallons of these waters there is about one ton of bi-carbonate of lime, or 111¼ tons in June and 112 in July. About two-thirds of this weight of lime or chalk would be removed by Dr. Clark's softening process—that is, in June 74 tons, and in July about 75 tons. In each year about 25,000 tons of useless lime would be removed from the metropolitan waters by the simple and easy process now in use at Canterbury." The Registrar adds: "This riddance of the foreign matter, which deprives water of some of its cleansing properties, is in itself an advantage; but, besides this, the fine precipitate of chalk carries down with it suspended impurities and probably frees it from choleraic and other contagions. It is a most effective filtration." It is a comfort to know that the working classes are beginning to feel their strength. When that is put forward it is certain to be in the direction of sanitary and educational measures. The Registrar-General appends to his report a concise sketch of the steps proper to be taken in view of the threatened epidemic.

A correspondent at St. Andrews informs us that Professors Helmholtz, Huxley, Sylvester, Peters, Tait, Wyville Thomson, and Crum Brown, with several other *savans*, are now in that city, where there appears to be a sort of after-glow of the British Association. Our correspondent remarks on some points of interest in connection with the recent meeting of the Association. There was an unprecedented number of senior and second wranglers and Smith's prizemen in attendance in Section A. Among these we may mention, not vouching, however, for the completeness of our list, Prof. Helmholtz and Baron Liebig, M. Dumas, and Profs. Poggendorf, Bunsen, and Hofmann, all expressed great regret that they were unable to attend. Among other distinguished men present under circumstances, in some cases, of great difficulty, were Prof. Delffs, of Heidelberg, Dr. Baunhauer, of Haarlem, Drs. Anderson, Stenhouse, and Apjohn, Prof. Williamson, and others.

A correspondent of the *Times* writes that on Monday, at 3.45 A.M., while at Worthing, he felt a distinct shock of earthquake. "My first impression," he says, "was as if some person in the room above had fallen heavily on the floor, again and again. A second followed in about a minute and a half, but of less violence; each was accompanied by a low murmur as of a distant waggon. Again last (Tuesday) night, shortly before midnight, another but slighter shock was felt. On the first occasion many people were much alarmed, and, until able to compare notes, attributed the unusual sounds to a variety of causes. One gentleman drew a sword and searched his house for burglars. A family of unprotected females found relief in hysterics; but, almost to a minute, all were agreed in their statement of the time of the disturbance."

Late advices from Captain Hall's expedition in the *Polaris* state that the party reached Newfoundland in good condition, and was received with the utmost attention by the authorities. Captain Buddington, the sailing and ice-master of the expedition, has resigned, and will probably be replaced at Disco by Captain Richard Tyson. The United States frigate *Congress* has left New York with additional supplies of provisions, coal, &c., for the *Polaris*, and will proceed by the most direct route to the depôt agreed upon in Greenland. A number of persons accompany this vessel, among them Mr. Bryan, the astronomer of the expedition, and several gentlemen who will return in the *Congress*.

The total expenses of the Mont Cenis Tunnel amount to 65,000,000f., of which 20,000,000f. are to be contributed by the Railway of Northern Italy, and more than 25,000,000f. by the French Government. The masonry of the tunnel is reported to be excellent throughout, and no inconvenience whatever from smoke, steam, or mephitic air is apprehended.

Sir R. Murchison has received a letter from Dr. Kirk, British Consul at Zanzibar, in which he states that Dr. Livingstone is moving slowly but safely, evidently feeling his way, and "determined to leave little doubts behind him this time."

An association for the promotion of scientific instruction among the working classes, in connection with the Government Science and Art Department, has been formed at West Bromwich, and on Monday evening the movement was formally inaugurated at a meeting held in the schools in Bratt Street. The classes will open shortly for a winter session.

Co-operation on the part of the Dominion of Canada in the storm-signal observations of the United States commenced on the 15th of last month. Telegraphic reports and communications will be made from a number of stations in the Province of Quebec, and published from Washington with the regular series, the observations from the United States being telegraphed back in return. Dr. Smallwood, the well-known meteorologist of Montreal, is in charge of a central office in that city, where the local reports are to be concentrated, and whence they are to be communicated to Washington, and to whom the returns are to be transmitted.

A natural science demyship, of the annual value of 95*l.* and tenable for five years, will be awarded at Magdalen College, Oxford, in October next. The examination will commence on October 3, and candidates must call on the president on the day previous. This examination will be held in common with Merton College, where a Postmastership, of the annual value of 80*l.* for five years, will be awarded at the same time and with the same papers. Each candidate will be considered as standing in the first instance at the college at which he has put down his name, and, unless he has given notice to the contrary, will be regarded as standing at the other college also.

The Zoology Exhibition, value 40*l.*, for two years, at the preliminary Scientific and 1st B.Sc. examinations of London University has this year been obtained by Mr. J. C. Saunders, of Downing College, Cambridge.

Dr. H. Alleyne Nicholson has resigned his Lectureship on Natural History in the Extra-Academical Medical School of Edinburgh, and is now in Toronto.

An expedition for botanical purposes is in course of formation to the summit of Mount Bellendenker and the Endeavour River in Queensland. This mountain is situated on the east coast, near Cape Grafton, and nearly opposite the head of the gulf of Carpentaria, and the Endeavour River is a little farther north. It is the highest mountain on the Queensland coast. It is very probable that many new plants will be found in the course of this expedition, as the country is almost virtually unexplored. The last explorer was Kennedy, who was killed twenty years ago. It was in the Endeavour River that Captain Cook landed and cleaned his vessel after the discovery of the Torres Straits

NOW that the so-much-dreaded cholera is rapidly approaching our shores, it behoves everyone to be able to recognise the preliminary symptoms of the disease and to guard against them. We would therefore most strongly recommend all who can to read a most valuable and instructive paper by Mr. John Murray, the Inspector-General of Indian hospitals, on "Cholera: its Symptoms and Early Treatment," which was read at the recent meeting of the British Medical Association at Plymouth. It would be a very great boon to society, and probably the saving of many lives, if this paper could be published as a penny pamphlet.

THREE exhibitions, giving free education, and tenable in the department of General Literature and Science, or in that of Engineering and Technical Science, will be open to new students at the Hartley Institution, Southampton, at the commencement of the autumn term next month.

AN earthquake took place in Chiriqui in the State of Panama on the 26th June, at 7.50 P.M. It was rather severe, but no damage was done.

THE U.S. sloop of war *Jamestown* sailed from Valparaiso on the 3rd June, to determine the position of certain reefs and islands reported to have been discovered between the Equator and 24° N.

THE district round Wagga-Wagga, in Australia, was disturbed on June 8 by a somewhat violent earthquake shock; and, owing to the rarity of the occurrence of such phenomena, it has caused much interest. The shock consisted of a succession of sharp but continuous vibrations, lasting altogether for about twenty seconds, the motion appearing to be from the N. W. to the S. E. There was felt, at 16 minutes to 3 P.M. (local time), a slighter second shock, preceded like the first, by a dull rumbling sound.

IN a letter to the *American Journal of Science and Art*, Dr. B. A. Gould reports satisfactory progress with respect to the Cordova Observatory. Although the enterprise has met with an exceptional amount of obstacles, Dr. Gould, who writes on the 26th of April last, expected to begin the mounting of the instruments in the course of a few days. We shall probably recur to his interesting communication.

OBSERVATIONS OF LUMINOUS METEORS IN THE YEARS 1870-71*

THE object of the Committee was, as last year, to present a condensed report of the observations which they have received, and to indicate the progress of Meteoric Astronomy during the interval that has elapsed since the last report. A valuable list of communications on the appearances of luminous meteors has been forwarded to the Committee in the course of the year, as well as regular observations of star showers. The heights and velocities of thirteen shooting-stars obtained by the co-operation of Mr. Glaisher's staff of observers at the Royal Observatory, Greenwich, during the watch for meteors on the nights of the 5th to the 12th of August last, are sufficiently accordant with the velocity of the Perseids, as previously determined by similar means in the year 1863, to afford a satisfactory conclusion that the results of direct observation are in very close agreement with those derived from the Astronomical Theory of the August Meteor Stream. On the mornings of the 13th to the 15th of November last, a satisfactory series of observations of the November star shower (as far as its return could be identified), recorded at the Royal Observatory, Greenwich, and at several other British Association stations, concurs with very similar descriptions of its appearance in the United States of America, in showing the rapid decrease of intensity of this display, since the period of greatest brightness which it attained in the years 1866 and 1867.

Notices of the appearance of more than twenty fire-balls and small bolides have, during the past year, been received by the Committee; fourteen of the former were compared to the apparent size and brightness of the moon, and the latter include three detonating meteors of the largest class. Descriptions of some of the largest of these meteors are given at length in the report. No notice of the fall of an aërolite during the past year has been received, although the occurrence of large meteors during the Autumn and Spring months was unusually frequent. The locality of one of these, which appeared with unusual brightness in the South of England, on the evening of the 13th of February can be determined at least approximately, as also the elevation of its path.

A table of the height of sixteen shooting stars doubly observed in England during the meteoric shower of August 1870 (independently of the observations made at the Royal Observatory, Greenwich), appeared in the last volume of the British Association Reports. A comparison of the observations made at the Royal Observatory, Greenwich, on that occasion, with those recorded at the other stations, enables the paths of thirteen meteors, seen by Mr. Glaisher's staff of observers (ten of which are new to the former list), to be determined; and the heights and velocities of the meteors thus identified are entered in the Report. The results are as follows: The average height of 16 meteors contained in the last report was 74 miles at appearance and 48 miles at disappearance; of 13 meteors (given in the present list), 72 miles at appearance and 54 miles at disappearance; of 20 meteors (observed in August, 1863), at appearance 82 miles, at disappearance 58 miles. The present average heights are thus somewhat less than those observed in 1863, but they agree more closely with the general average height at first appearance, viz., 70 miles, and that at disappearance, viz, 54 miles. The average velocity of the Perseids (relatively to the earth) observed in the year 1863 was thirty-four miles per second, and that of three Perseids in the present list was thirty-seven miles per second; while the velocity on the astronomical theory, as calculated by Prof. Schiaparelli, was thirty-eight miles per second.

A considerable shower of shooting-stars was also noted on the night of April 20 last, of which preparations were made to record the progress, with satisfactory results.

The report, which was full and elaborate, contained a description of the new meteor-showers noted during the few last years by Prof. Schiaparelli, agreeing in many points with previous determinations by the Committee from the observations contributed to the British Association, and suggesting considerations of novel and important interest in relation to the probable explanation of certain facts regarding the radiant points of shooting-stars. These are in some cases (more or less exactly) simple, double, or multiple points; and in other cases present a wide central space or region of "diffuse radiation." On the other hand, distinct radiant points of ordinary shooting stars, observed on several closely adjacent nights, although apparently exhibiting no other connection with each other by meteors observed on the intervening dates, sometimes including many days, are yet so nearly identical in their positions as to make it almost certain that they belong to distinct families or systems of meteor-streams. Prof. Schiaparelli shows, in a preliminary discussion of these results, that if the particles of a small meteor-cloud, entering from extraplanetary space the region of the sun's attraction, is deflected from its primitive course by the attraction of one of the larger planets into an elliptic orbit round the sun, the velocities of its particles, in their elliptic orbits, will, in general, differ slightly among themselves; and the meteor-group will, in consequence, extend itself into a continuous stream of gradually increasing length along the orbit of the group. Although the continuity of the group will be preserved along its whole length during this extension, yet the stream will only form a continuous meteor-ring (when the foremost particle overtakes the hindmost one in its course) if, while gaining one complete revolution upon the latter, this and the foremost particle of the stream continue to describe the same orbit round the sun, or an orbit which undergoes the same perturbations by the planets. But since the two ends of the stream, during its extension, occupy very different positions in space, the orbits of the extreme particles are, in general, very differently affected by the attractions of the planets; and, when the particles in advance have gained one entire revolution upon those in the rear, the group will not, in general, form a closed ring; but an open, spiral curve, the ends of which, instead of exactly meeting, will generally overlap each other. When the first particle has gained a second revolution in advance upon the last, a second convolution of the coil will generally be added to the spiral curve; and no perfect meteor-annulus, for the same reason as before, will generally be formed by this circuit, or by any succeeding circuits of the meteor-stream, until its length and the number of its circuits are indefinitely increased. Since the thickness and

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* Report of Committee, British Association, 1871.